

assign device 132a to energy deficiency level 303, in response to the evaluation of data in tables 320, 322, and/or application data 224.

[0044] Processing module 114 may generate control signal 150 based on the assignment of devices 132 to energy efficiency levels 301, 302, 303. Control signal 150 may be a series of binary signals, a bit vector, etc. For example, if control module 116 includes two switches, control signal 150 may be a bit vector of a length of two. If control module 116 includes four interfaces, control signal 150 may be a bit vector of a length of four. In the example, processing module 114 may generate control signal 150 to allow a transmission of energy 104 to device 132b based on the assignment of device 132b to energy deficiency level 301. Similarly, processing module 114 may generate control signal 150 to interrupt a transmission of energy 104 to device 132a based on the assignment of device 132a to energy deficiency level 303. In the example, where control signal 150 may be a bit vector of a length of two, control signal 150 may be “01”, where the least significant bit (‘1’) may be effective to activate a switch in control module 116 that corresponds to interface 113b, and the most significant bit (‘0’) may be effective to deactivate a switch in control module 116 that corresponds to interface 113a.

[0045] In some examples, processing module 114 may receive an update on device data 138 periodically, such as at intervals of 15 minutes, 30 minutes, etc. In response to receiving updated device data 138, processing module 114 may reassign devices to energy efficiency levels. For example, an updated version of device data 138a may be received where current energy quantity 314a is lowered to fifty percent and device application data 310a indicates a suspension of twenty device applications. Processing module 114, based on the updated version of device data 138a, may reevaluate device data 138a and device data 138b, and may reassign device 132a to energy deficiency level 302. Processing module 114 may further regenerate control signal 150 based on the reassignment of device 132a to energy deficiency level 302. In some examples, when two or more devices are assigned to a same energy deficiency level, processing module 114 may execute energy control instructions 305 to rank the two or more devices. For example, if devices 132a, 132b are both assigned to energy deficiency level 301, processing module 114 may rank devices 132a, 132b in order to determine which device should receive energy 104 first. Processing module 114 may rank devices 132a, 132b based on current energy quantity 314. If an current energy quantity 314 of device 132b is less than an current energy quantity 314 of device 132a, then device 132b may be ranked higher than device 132a and may receive a high charging priority. In some examples, processing module 114 may further rank devices 132 based on device data 138 and/or application data 224.

[0046] FIG. 4 illustrates example system 100 of FIG. 1 with additional detail relating to control a distribution of energy, arranged in accordance with at least some embodiments described herein. FIG. 4 is substantially similar to system 100 of FIGS. 1-3, with additional details. Those components in FIG. 4 that are labeled identically to components of FIGS. 1-3 will not be described again for the purposes of clarity.

[0047] Control module 116 may receive control signal 150 from processing module 114. In the example, control module 116 may include one or more switches 410 (including

switch 410a and switch 410b). Switch 410a may be configured to be in communication with interface 113a of interface module 112. Switch 410b may be configured to be in communication with interface 113b of interface module 112. In an example where control signal 150 may be “10”, control signal 150 may be effective to deactivate switch 410a and activate switch 410b. When switch 410a is deactivated, energy 104 may be not be transmitted from energy source 102 to device 132a through interface 113a. When switch 410b is activated, energy 104 may be transmitted from energy source 102 to device 132b through interface 113b. In another example where control signal 150 may be “11”, control signal 150 may be effective to activate switches 410a, 410b. In another example where control signal 150 may be “10”, and device 132a is not assigned to an energy deficiency level, processing module 114 may send a request to device 132a to discharge energy to device 132b. When energy is discharged from device 132a, interface module 112 may receive the discharged energy from device 132a and may transmit the discharged energy to device 132b. In some examples, interface module 112 may further include a unit 412, where unit 412 may include a controller configured to facilitate receipt and/or transmission of energy among devices 132. Unit 412 may be configured to be in communication with interfaces 113. In some examples, unit 412 may further include an energy storage component configured to store the discharged energy from device 132a.

[0048] In another example, where device 132b is assigned to energy deficiency level 301 and device 132a is not assigned to an energy deficiency level, processing module 114 may further determine a charge quantity 420 and a discharge quantity 422. Charge quantity 420 may be an amount of energy 104 to be transmitted to device 132b, and discharge quantity 422 may be an amount of quantity of energy to be discharged by 132a. Energy control instruction 305 may include an energy flow condition 424 that may be a condition effective to indicate a balanced energy flow among devices 132. For example, energy flow condition 424 may be represented by:

$$f = a_1x_1 + a_2x_2 + a_3x_3 + \dots$$

where f may represent energy flow condition 424;  $a_i$  may represent battery loss rate 334 of a device of an index i, for example,  $a_1$  may represent battery loss rate 334a of device 132a and  $a_2$  may represent battery loss rate 334b device 132b; and  $x_i$  may represent charge quantity 420 or discharge quantity 422 for a corresponding device of index i.

[0049] Processing module 114 may execute energy control instruction 305 to determine a constraint on charge quantity 420 and/or a constraint on discharge quantity 422 of devices 132. Constraints on charge quantity 420 and discharge quantity 422 may be effective to define a optimal solution of energy flow condition 424, which may relate to a minimum amount of energy loss experienced by system 100. In an example, a particular device may be assigned to energy deficiency level 301 or energy deficiency level 302, which requires charging. A constraint on charge quantity 420 for the particular device may be to limit charge quantity 420 to less than, or equal to, a difference between a full energy quantity and current energy quantity 314 of the particular device. A full energy quantity of a device may be one hundred percent (denoted as 1) of energy remaining in a battery of the device. For example, when device 132b is assigned to energy efficiency level 301, a constraint on a